Sony International (Europe) GmbH
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Claims:

Sub B'

1. Method for generating synchronization bursts for OFDM transmission systems, comprising the following steps:

- mapping (2) the symbols of a predefined symbol sequence according to a predefined mapping scheme on subcarriers of the OFDM system, wherein the symbols of the predefined symbol sequence represent subcarriers of the OFDM system with non-zero-amplitudes, and
- generating a synchronization burst by Inverse Fast Fourier Transforming (3) the subcarriers of the OFDM system mapped with the symbols of said predefined symbol sequence,

characterized in that

the predefined symbol sequence is set such that the envelope fluctuation of the time domain signal of the synchronization burst is minimized.

2. Method according to claim 1,
characterized in that
the predefined symbol sequence is chosen such that the following equations are satisfied for all symbols of the predefined symbol sequence:

$$n = 2m,$$

$$C_{i-1} = \pm C_{n-i}$$

wherein:
n is the number of symbols of the predefined symbol sequence,
m is an integer larger than one,
C is the symbol value, and
i is an integer running from 1 to m.

3. Method according to ~~anyone of the preceding claims~~ claim 1,

characterized in that

the mapping (2) of the symbols of the predefined symbol sequence and the Inverse Fast Fourier Transform is set such that the resulting time domain signal of the synchronization burst represents a periodic nature.

4. Method according to claim 1 ~~anyone of the preceding claims,~~

characterized in that

the mapping (2) of the symbols of the predefined symbol sequence and the Inverse Fast Fourier Transform is set such that one burst part of the synchronization burst in the time domain is generated and the periodic nature of the synchronization burst in the time domain is achieved by copying the one burst part.

5. Method according to claim 1 ~~anyone of the preceding claims~~,

characterized in that

the number of symbols of a symbol sequence n is equal to 12.

6. Method according to claim 1 ~~anyone of the preceding claims~~,

characterized in that

the symbol values C of the predefined symbol sequence can be expressed as:

A A A -A -A -A -A A -A -A A -A,

A being a complex value.

7. Method according to claim 1 ~~anyone of claims 1 to 5,~~

characterized in that

the symbol values C of the predefined symbol sequence can be expressed as:

A -A A A -A A A A A -A -A -A

A being a complex value.

8. Method according to claim 1 ~~anyone of claims 1 to 5~~,

characterized in that

the symbol values C of the predefined symbol sequence can be expressed as:

A B -A B -A -B B A -B A -B -A

A, B being complex values.

9. Method according to ~~anyone of claims 1 to 5~~ claim 1,
characterized in that
the symbol values C of the predefined symbol sequence can be expressed as:

A -B -A -B -A B -B A B A B -A

A, B being complex values.

10. Method according to ~~anyone of claims 1 to 5~~ claim 1,
characterized in that
the symbol values C of the predefined symbol sequence can be expressed as:

A -B -A B -A B B -A B -A -B A

A, B being complex values.

11. Method for synchronizing wireless OFDM systems,
characterized by the steps of
- generating a synchronization burst according to a method ~~according to anyone of the preceding claims~~ claim 1, and
- transmitting the synchronization burst.

12. Method according to claim 11,
characterized in that
the time domain signal of the synchronization burst is precomputed (7) and stored in a memory (6).

13. Method according to ~~anyone of the preceding claims,~~ claim 1
characterized in that
the predefined symbol sequence is set such that the dynamic range of the time domain signal is minimized.

14. OFDM transmitter,
comprising:

- a mapping unit (2) for mapping the symbols of a predefined symbol sequence according to a predefined mapping scheme on subcarriers of the OFDM system, wherein the symbols of the predefined symbol sequence represent subcarriers of the OFDM system with non-zero amplitudes, and
- an Inverse Fast Fourier Transforming unit (3) for generating a synchronization burst by Inverse Fast Fourier Transforming (3) the subcarriers of the OFDM system mapped with the symbols of said predefined symbol sequence,

characterized in that

the mapping unit (2) uses a predefined symbol sequence which is set such that the envelope fluctuation of the time domain signal of the synchronization burst is minimized.

15. OFDM transmitter according to claim 14,

characterized in that

the predefined symbol sequence is set such that the following equations are satisfied for all symbols of the predefined symbol sequence:

$$n = 2m,$$

$$C_{i-1} = \pm C_{n-i}$$

wherein:

n is the number of symbols of the predefined symbol sequence,

m is an integer larger than one,

C is the symbol value, and

i is an integer running from 1 to m.

16. OFDM transmitter according to ~~anyone of claims 14 or 15~~ claim 14,

characterized in that

the mapping unit (2) is designed such that the resulting time domain signal of the synchronization burst represents a periodic nature.

17. OFDM transmitter according to ~~anyone of claims 14 or 15~~ claim 14,

characterized in that

the mapping unit (2) is designed such that one burst part of the synchronization burst in the time domain is generated and the periodic nature of the synchronization burst in the time domain is achieved by copying the one burst part.

18. OFDM transmitter according to claim 17,
characterized in that
a time extension unit (4) copies the burst part to achieve a periodic nature of the time domain signal.

19. OFDM transmitter according to ~~anyone of claims 14 to 18,~~ claim 14
characterized in that
the number of symbols of a symbol sequence n is equal to 12.

20. Transmitter according to ~~anyone of the claims 14 to 19~~, claim 14
characterized in that
the symbol values C of the predefined symbol sequence can be expressed as:
A A A -A -A -A -A A -A -A A -A,
A being a complex value.

21. Transmitter according to ~~anyone of claims 14 to 19~~, claim 14
characterized in that
the symbol values C of the predefined symbol sequence can be expressed as:
A -A A A -A A A A A -A -A -A
A being a complex value.

22. Transmitter according to ~~anyone of claims 14 to 19~~, claim 14
characterized in that
the symbol values C of the predefined symbol sequence can be expressed as:
A B -A B -A -B B A -B A -B -A
A, B being complex values.

23. Transmitter according to ~~anyone of claims 14 to 19,~~ claim 14

characterized in that

the symbol values C of the predefined symbol sequence can be expressed as:

A -B -A -B -A B -B A B A B -A

A, B being complex values.

24. Transmitter according to ~~anyone of claims 14 to 19~~ claim 14,

characterized in that

the symbol values C of the predefined symbol sequence can be expressed as:

A -B -A B -A B B -A B -A -B A

A, B being complex values.

25. Transmitter according to ~~anyone of claims 14 to 24~~ claim 14,

characterized by

a processing unit (7) for precomputing the time domain signal of the synchronization burst and a memory (6) for storing the precomputed time domain signal of the synchronization burst.

26. Transmitter according to ~~anyone of the claims 14 to 25~~ claim 14,

characterized in that

the predefined symbol sequence is set such that the dynamic range of the time domain signal is minimized.

27. Mobile communications device,

comprising a transmitter according to ~~anyone of claims 14 to 26~~ claim 14.